Overhead Cranes and Hoists

SPP# 1910.179A

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1.0 Purpose

The purpose of this safety policy and procedure is to ensure all overhead cranes and hoists used by North Carolina Department of Transportation (NCDOT) employees are installed, inspected, maintained and operated in a safe manner.

2.0 Scope and Applicability

This safety policy and procedure applies to overhead cranes and hoists, including, top running or underhung bridge cranes, monorail cranes, fixed hoist and others having the fundamental characteristics of a hoisting mechanism attached to a movable bridge or trolley and traveling on an overhead runway structure or fixed structure to move loads.

This safety policy and procedure details the areas of responsibility for managers/unit heads, County Maintenance Engineer, qualified persons, supervisors, employees, Safety Engineers, and the Central Equipment Unit within NCDOT.

3.0 Reference

This safety policy and procedure is established in accordance with OSHA 29 CFR 1910.179, Overhead Cranes and the ANSI/ASME B.30 series.

4.0 Policy

It is the policy of NCDOT to provide a place of employment that is free from recognized hazards that cause or are likely to cause death or serious physical harm to employees or the public. All overhead cranes and hoists covered by the scope of this policy and procedure shall be properly installed, inspected, maintained and operated in a safe manner.

5.0 General Responsibilities

It is the responsibility of each manager/unit head, supervisor, and employee to ensure implementation of NCDOT's safety policy and procedure on overhead cranes and hoists. It is also the responsibility of each NCDOT employee to immediately report any unsafe act or condition to his or her supervisor. Specific responsibilities are found in Section 6.3.

6.0 Procedure

This section provides applicable definitions, establishes general provisions, and identifies specific requirements required by NCDOT's safety policy and procedure for overhead cranes and hoists.

6.1. Definitions

Crane

A machine for lifting and lowering a load and moving it horizontally, with the hoisting mechanism an integral part of the machine.

Overhead crane

A crane with a movable bridge carrying a movable or fixed hoisting mechanism and traveling on an overhead fixed runway structure

Wall crane

A crane having a jib with or without trolley and supported from a sidewall or line of columns of a building. It is a traveling type and operates on a runway attached to the sidewall or columns.

Monorail Crane

A crane having a hoist attached to a trolley that moves either on the top or bottom flange of a beam runway.

Bridge Girder

A crane member, on which trolleys travel horizontally, mounted between and supported by trolleys or end trucks.

Hoist

An apparatus that lifts or lowers a load. It can be installed in a fixed location or on an overhead trolley.

Hoist chain

The load bearing chain.

Qualified person

A person who, by possession of a recognized degree in an applicable field or certificate of professional standing, or by extensive knowledge, training, and experience has successful demonstrated the ability to solve problems relating to the subject matter at hand.

Rated Load

The maximum load for which a crane or individual hoist is designed and built by the manufacturer and shown on the equipment nameplate(s).

Frequent Inspection

A monthly inspection at a minimum.

Periodic Inspection

An annual inspection at a minimum.

6.2. General Provisions

This section details the provisions of this safety policy and procedure with each provision discussed in a separate subsection. These provisions are:

- o Construction, Installation and Marking
- o Inspection of Overhead cranes and Hoists
- o General Operation and Use

6.2.1. Construction, Installation and Marking

Overhead cranes and hoists shall be constructed using hoists, and trolleys, meeting the guidelines of OSHA 1910.179 and the ANSI/ASME B.30 series.

Overhead crane runways and supporting structures shall be designed, constructed and installed to withstand the loads and forces imposed by the crane. A qualified person familiar with structural loading shall review the support structure holding the overhead crane/hoist prior to load testing.

The overhead crane and/or hoist load rating shall be marked on each side of the girder holding the overhead crane or hoist and shall be visible from the ground. The load rating shall be marked on the trolley, hoist, load block, and hook. The **initial** load test will be 125% of the desired rating. For additional load test information see Section 6.2.2.5 Load Testing.

6.2.2. Inspection of overhead cranes and hoist

Documentation

All inspection forms will be filed by hoist number and be available for auditing/inspection as required.

Any overhead crane or hoist that does not have documented proof or has not been inspected as outlined in this Safety Policy and Procedure since its initial installation, must be taken down and inspected to ensure that the overhead crane/hoist is within manufacturer/factory specifications.

6.2.2.1. Training of Inspection Personnel

Employees inspecting and maintaining overhead cranes and hoists shall receive training specific to the type of inspection they will perform i.e. pre- use, frequent, periodic inspection, load testing, and maintenance.

This training shall be completed before an employee begins inspecting an overhead crane. It is recommended that re-training occur every three years or when equipment or job conditions change. Re-training should also occur if there is an indication or incident that suggests lack of knowledge or skill.

A qualified person shall conduct or direct this training.

6.2.2.2 Pre-use inspection

Each overhead crane or hoist shall be given a pre-operational inspection. At a minimum this inspection shall include a visual inspection of the hook for safety latch, cracks, bends or twists, and overhead crane/hoist operation that is smooth with no unusual sounds. This inspection does not need to be documented.

6.2.2.3 Frequent (Monthly) Inspection

Each overhead crane/hoist shall be given a frequent inspection. At a minimum, this inspection shall be conducted monthly and include a visual examination of the following areas:

- Operating controls
- Trolley and bridge
- Beams for damage
- Power supply
- Chain limit switch
- Hook for deformation and safety latch
- Proper lubrication

This inspection shall be documented on NC DOT Overhead Hoist Inspection "Frequent" Form CC-39. (See Appendix B: Inspection Forms)

Note: Some hoists are only used seasonally and only need inspection when in use. When used seasonally, it is recommended that overhead cranes/hoists be removed from the elements until the active season

begins. A frequent inspection must be conducted and documented prior to the first use of a seasonal hoist.

6.2.2.4 Periodic (Annual) Inspection

Each overhead crane/hoist shall be given a periodic inspection. At a minimum this inspection shall be conducted every twelve months and include an examination of the following areas:

- The items in the frequent inspection
- Measurement of the chain or wire rope and the hook.
- Inspection of the brake unit
- Electrical wiring and instructional decals
- Beam bolts and other attachment hardware
- Bent, cracked or corroded members on the bridge or runways
- Magnetic particle or dye penetrant non-destructive testing of all hooks
- Shafts, bearing, bushings and couplings
- Annual Load Test

This inspection shall be documented on NC DOT Overhead Hoist Inspection "Periodic", (Annual Form) CC-40. (See Appendix B: Inspection Forms)

6.2.2.5 Load Testing

A qualified person shall conduct all load tests. All load tests shall be conducted over the entire scope of the crane travel and shall be documented on the NC DOT Overhead Crane, Load Test Report. (See Appendix B: Inspection Forms, Load Test Report, Form CC-41.)

There are several different times when load testing is required. The following describes those circumstances:

• Initial Load Test

This test is required for any existing overhead crane/hoist that does not have documented proof of previous load testing as outlined in this Safety Policy and Procedure or for any new overhead crane/hoist. The **initial load test** will be 125% of the desired rating.

• Periodic "Annual" Inspection

As part of the periodic or annual inspection, each overhead crane/hoist shall be load tested at a minimum of 100% but not to exceed 125% of the rated load capacity.

• After Load-handling component repair or replacement Anytime an overhead crane/hoist load-handling component has been repaired or replaced, the overhead crane/hoist shall be load tested. The load test shall be a minimum of 100%, but shall not exceed 125% of rated capacity.

6.2.3 General Operation and Use

6.2.3.1 Training of Operators

All employees shall be trained in the proper pre-use inspection and operation of an overhead crane and hoist. This training should be completed before an employee begins using an overhead crane/hoist. It is recommended that re-training occur every three years or when equipment or job conditions change. Re-training should also occur if there is an indication or incident that suggests lack of knowledge or skill.

A qualified person shall conduct or direct this training.

6.2.3.2 Hosting Practices

The operator shall practice the following good operation practices:

• The operator shall be focused on the operation of the overhead crane/hoist and the load.

- Each operator is responsible for the load while it is under his or her control. If there is any questions as to the safety of the lift; then the operator shall stop operations until safety has been assured.
- No load shall be left unattended when not landed.
- The overhead crane/hoist shall be operated in a smooth deliberate manner and shock loading shall be avoided.
- The overhead crane/hoist shall not be loaded above the rated load limit.
- The load shall be directly under the hoist to prevent the load from swinging when lifted. (Use tag lines as needed)
- The slings shall be inspected visually for damage prior to use and shall not be overloaded.
- Slings and other lifting devices must be fully and securely seated in the hook before lifting the load.
- The load shall not be carried or positioned over personnel.
- Employees in the direction of travel should be warned to move and stay clear of the load at all times.

6.2.3.3 Handling the load

Only personnel trained in the safe operation of an overhead crane or hoist shall operate this equipment. No load will be moved until:

- All precautions have been taken to ensure that the load does not exceed the posted rated capacity of the overhead crane/hoist system.
- It has been determined that the load can be lifted, moved and lowered in a safe manner.
- All personnel are clear of pinch points.

6.2.3.4 Lockout/Tagout of Overhead Crane/Hoist

Any overhead crane/hoist that is unsafe, in need of repair or in the process of being repaired shall be:

- Rendered inoperable by disconnecting the power supply and attaching a lockout device and tag if an electric type of overhead crane/hoist or chained together with a lock and tag if a manual chain fall type hoist.
- The control panel shall be tagged with a tag that reads: Do Not Operate.

Employees should never operate an overhead crane/hoist that has been tagged with a "Do Not Operate" tag.

6.3. Specific Responsibilities

6.3.1 Managers/Unit Heads

Managers/Unit Heads will be responsible for:

• Ensuring adequate funds are available and budgeted for the purchase of overhead cranes and hoist as well as replacement components in their areas.

6.3.2 County Maintenance Engineers, Bridge Maintenance Supervisors, Equipment Sub-shop Supervisors, Ferry Superintendents and Rail Operations Manager will be responsible for:

County Maintenance Engineers, Bridge Maintenance Supervisors, Equipment Sub-shop Supervisors, Ferry Superintendents and Rail Operations Manager will be responsible for

- Identifying the employees within their unit that are affected by this safety policy and procedure
- Coordinating the required training for the affected employees
- Coordinating the Periodic "annual" inspection of overhead cranes/hoists
- Ensuring that pre-use and "Frequent" inspections of overhead cranes/hoist are conducted.
- Consulting with a qualified person regarding overhead crane installation and inspection
- Ensuring compliance with this safety policy and procedure.

6.3.3 Qualified person

Qualified person will be responsible for:

• Solving or resolving problems relating to overhead crane systems such as the design, installation, frequent and periodic inspection and load testing.

6.3.4. Supervisors

Supervisors will be responsible for:

- Communicating appropriate needs to managers/unit heads
- Ensuring employees have been trained to operate overhead cranes

6.3.5 Employees

Employees will:

- Conduct pre-use inspection
- Each operator is responsible for the load while it is under his or her control. If there is any questions as to the safety of the lift, the operator shall stop operations until safety has been assured.
- Operate the overhead crane/hoist in a safe manner

6.3.6. Safety Engineers

Safety Engineers will:

- Provide consultative and audit assistance to ensure effective implementation of this safety policy and procedure
- Assist in developing or securing required training

6.3.7. Safety and Loss Control

Safety and Loss Control will provide:

- Assistance to managers/unit heads, supervisors, or others as necessary on any matter concerning this safety policy and procedure.
- Assist in developing or securing required training.
- Assist Purchasing and Central Equipment Unit to ensure that all newly purchased overhead cranes/hoists complies with current safety regulations and this safety policy and procedure.

6.3.8. Central Equipment Unit and Division Equipment

Central equipment and/or Division Equipment Sub-shops will provide:

• Qualified persons to conduct Periodic or "annual" inspections of overhead cranes/hoists

Appendix A: Types of Overhead Cranes/Hoist



Appendix A: Types of Overhead Cranes/Hoist (cont.)



Appendix A: Types of Overhead Cranes/Hoist (cont.)



Appendix B: Overhead Crane/Hoist Inspection Forms

NCDOT OVERHEAD CRANE LOAD TEST REPORT

WO #	SAP EQ. #
UNIT #	DATE
MAX. CAPACITY	HOIST S/N

OSHA 1910.179 (k) (2) Test loads shall not be more than 125% of the rated load unless otherwise recommended by the manufacturer.

This report shall be placed on record and made readily available to all appointed personnel.

Test loads shall be no less than 100 % of rated capacity.

RATED	CAPACITY	LBS.

TEST LOAD APPLIED _____ LBS.

PROBLEMS FOUND

INSPECTOR	DATE

This report shall certify that this overhead crane has lifted the test load in a smooth and predictable manner. All brakes, bridge trucks, and hoist trolleys are working properly at this time. Any problems resulting from this test have been repaired or defective parts replaced, and this unit is ready for service.

CC-41 9/99

NCDOT OVERHEAD HOIST INSPECTION "FREQUENT"

WO # ______ "Inspections shall be made monthly" SAP EQ. # ______

DATE

UNIT #_____

BRIDGE TRUCK S/N_____

TROLLEY S/N

HOIST MAKE

HOIST S/N

ITEM	BASELINE THROAT	REJECT AT	MEASUREMENT THROAT	SAT	UNSAT	DATE REPLACED
LOAD						
HOOK						

"Always follow lock out / tag out procedures. Utilize Warning signs and barriers in the work area before beginning inspections"

CHAIN #	BASELINE	REJECT AT	MEASUREMENT	SAT	UNSAT	DATE REPLACED
WIRE ROPE	BASELINE	REJECT AT	MEASUREMENT	SAT	UNSAT	DATE REPLACED
WIRE ROPE	BASELINE	REJECT AT	MEASUREMENT	SAT	UNSAT	DATE REPLACED

ITEM	SAT	UNSAT	ITEM		SAT	UNSAT
OPERATING CONTROLS			ELECTRICAL CORD	N/A		
			& REEL			
TROLLY & BRIDGE TRAVEL			PENDANT CABLE	N/A		
LUBE CHAIN			OIL LEAKS AT HOIST	N/A		
TRUCK & TROLLEY WHEELS			CHAIN LIMIT SWITCH	N/A		
FOR DAMAGE			OPERATION			
TRUCK & TROLLEY SIDE PLATE			HOIST CHAIN SMOOTH			
ADJUSTMENT			OPERATION			
TRUCK & TROLLEY N/A			TOP HOOK VISUAL	N/A		
WHEEL LUBE						
BEAMS FOR DAMAGE			HOOK SAFETY LATCHES			

FOR FAULTY ITEMS USE REMARK SECTION

Inspector _____

Date _____

All deficiencies **shall** be carefully examined and a determination made as to whether or not they constitute a safety hazard. Any hoist found to be unsafe **shall** be taken out of service until it can be repaired or defective parts are replaced.

CC-39 7/04

NCDOT OVERHEAD HOIST INSPECTION

"PERIODIC"

"Inspections shall be made Annually."

DATE_____UNIT#_____

BRIDGE TRUCK S/N_____

TROLLEY S/N_____HOIST MAKE _____

HOIST S/N _____

"Periodic inspections shall be performed in intervals of no less than one year"

You are required to read and consult the **manual** for hoist/crane that is to be inspected. This checklist is in no way intended to replace it.

ITEM	SAT	UNSAT	ITEM	SAT	UNSAT
NCDOT FREQUENT INSPECTION			BENT, CRACKED, OR CORRODED MEMBERS ON BRIDGE OR RUN		
			WAY		
INSPECT HOIST BRAKE UNIT			MAG PARTICLE OR DYE PEN		
(refer to hoist manual)			TEST OF BOTH HOOKS		
DAMAGED OR WORN LOAD			ALL PINS, SHAFTS, BEARINGS,		
SHEAVE			BUSHINGS, AND COUPLINGS		
ALL WARNING AND			LUBE HOIST AS PER MANUAL		
INSTRUCTIONAL DECALS					
ALL ELECTRICAL N/A			PERFORM OPERATIONAL AND		
CONNECTIONS AND			LOAD TEST		
WIRE CONDITION					
ALL BEAM BOLTS OR OTHER					
ATTACHING HARDWARE					

FOR FAULTY ITEMS USE REMARK SECTION

SHOP SUPERVISOR	
	_DATE
	DATE
All deficiencies shall be carefully ex	xamined and a determination made as to whether
or not they constitute a safety haza	rd. Any hoist found to be unsafe shall
be taken out of service until it can b	e repaired or defective parts are replaced.

CC-40, 12/99